SIGNIFICANT FIGURES ASSIGNMENT

(33)

(a) $\frac{2.526}{3.1} + \frac{0.470}{0.623} + \frac{80.705}{0.4326}$

$= 0.81(5) + 0.754(4) + 186.5(6) \Rightarrow$

$0.81(5)$
$+ \ 0.754(4)$
$+ \ 186.5(6)$
188.1294

$188.1 \Leftarrow 188.1294$

(b) $\frac{6.404 \times 2.91}{18.7 - 17.1} = \frac{6.404 \times 2.91}{1.6} = 12$

18.7
$-\ 17.1$
1.6

(c) $6.071 \times 10^{-5} - 8.2 \times 10^{-6} - 0.521 \times 10^{-4}$

$8.2 \times 10^{-6} \xrightarrow{\div 10^1,\ \times 10^1} 0.82 \times 10^{-5}$

$0.521 \times 10^{-4} \xrightarrow{\times 10^1,\ \div 10^1} 5.21 \times 10^{-5}$

$\therefore$ 6.071×10^{-5}
$-\ 0.82 \times 10^{-5}$
5.251×10^{-5}
$-\ 5.21 \times 10^{-5}$
$0.041 \times 10^{-5} \Rightarrow 0.04 \times 10^{-5} \Rightarrow 4 \times 10^{-7}$

(d) $(3.8 \times 10^{-12} + 4.0 \times 10^{-13}) / (4 \times 10^{12} + 6.3 \times 10^{13})$

$4.0 \times 10^{-13} \xrightarrow{\div 10^1,\ \times 10^1} 0.40 \times 10^{-12}$

$6.3 \times 10^{13} \xrightarrow{\times 10^1,\ \div 10^1} 63 \times 10^{12}$

(d) continued:

$$\begin{array}{r} 3.8 \times 10^{-12} \\ +\ 0.40 \times 10^{-12} \\ \hline 4.20 \times 10^{-12} \end{array}$$

$$\Rightarrow 4.2 \times 10^{-12}$$

$$\begin{array}{r} 4 \times 10^{12} \\ +\ 63 \times 10^{12} \\ \hline 67 \times 10^{12} \end{array}$$

$$\therefore \quad \frac{4.2 \times 10^{-12}}{67 \times 10^{12}} = 6.3 \times 10^{-26}$$

(e)

$$\begin{array}{r} 9.5 \\ +\ 4.1 \\ +\ 2.8 \\ +\ 3.175 \\ \hline 19.575 \end{array}$$

$\Rightarrow 19.5(75)$

average:

$$\therefore \frac{19.5(75)}{4} = 4.9$$

the number of decimal places in an average value must be the same as that for the measurement with the smallest number of decimal places

(f) $$\frac{(8.925 - 8.905)}{8.925} \times 100\%$$

$$\begin{array}{r} 8.925 \\ -\ 8.905 \\ \hline 0.020 \end{array}$$

$$\therefore \frac{0.020}{8.925} \times 100\% = 0.22\%$$

(% error)

(34)

(a) $6.022 \times 10^{23} \times 1.05 \times 10^{2} = 6.32 \times 10^{25}$

(b) $$\frac{6.6262 \times 10^{-34} \times 2.998 \times 10^{8}}{2.54 \times 10^{-9}} = 7.82 \times 10^{-17}$$

(c) $1.285 \times 10^{-2} + 1.24 \times 10^{-3} + 1.879 \times 10^{-1}$

$\downarrow \div 10^{1} \quad \downarrow \times 10^{1} \qquad \downarrow \times 10^{1} \quad \downarrow \div 10^{1}$

$0.124 \times 10^{-2} \qquad 18.79 \times 10^{-2}$

$\therefore \quad 1.285 \times 10^{-2}$

$+ \quad 0.124 \times 10^{-2}$

$+ \quad 18.79 \times 10^{-2}$

$20.199 \times 10^{-2} \Rightarrow 20.20 \times 10^{-2}$

$\Rightarrow 2.020 \times 10^{-1}$

(d) $1.285 \times 10^{-2} - 1.24 \times 10^{-3}$

$\downarrow \div 10^{1} \quad \downarrow \times 10^{1}$

0.124×10^{-2}

$\therefore \quad 1.285 \times 10^{-2}$

$- \quad 0.124 \times 10^{-2}$

$1.161 \times 10^{-2} \Rightarrow 1.161 \times 10^{-2}$

(e) $\dfrac{(1.00866 - 1.00728)}{6.02205 \times 10^{23}}$

$1.00866 - 1.00728 = 0.00138$

$\therefore \dfrac{0.00138}{6.02205 \times 10^{23}} = 2.29 \times 10^{-27}$

(f) $\dfrac{9.875 \times 10^{2} - 9.795 \times 10^{2}}{9.875 \times 10^{2}} \times 100\%$

$9.875 \times 10^{2} - 9.795 \times 10^{2} = 0.080 \times 10^{2}$

$\therefore \dfrac{0.080 \times 10^{2}}{9.875 \times 10^{2}} \times 100\% = 0.81\%$

(9) $\left(\dfrac{9.42 \times 10^2 + 8.234 \times 10^2 + 1.625 \times 10^3}{3}\right)$

1.625×10^3

$\downarrow \times 10^1 \quad \downarrow \div 10^1$

16.25×10^2

$\therefore$

	9.42	$\times 10^2$
$+$	8.234	$\times 10^2$
$+$	16.25	$\times 10^2$
	33.90	4×10^2

$\Rightarrow 33.90(4) \times 10^2$

$\therefore$ average $= \dfrac{33.90(4) \times 10^2}{3}$

$= 11.30 \times 10^2$

$= 1.130 \times 10^3$